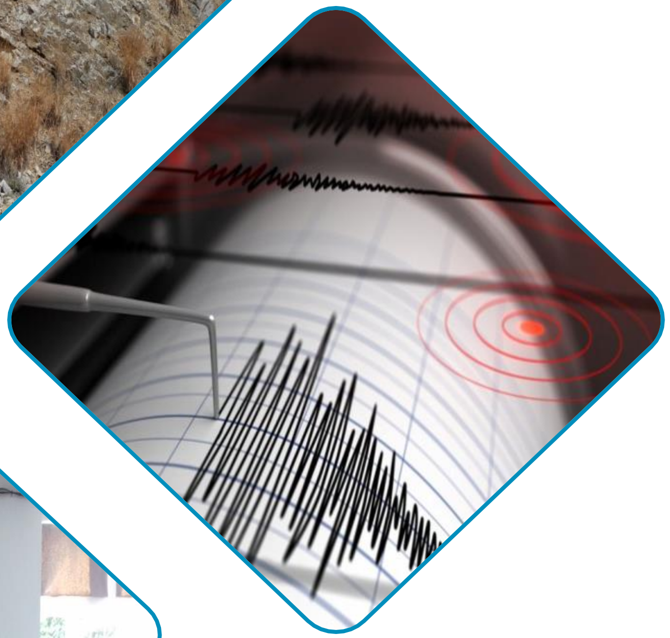
CRL School 2023



Teaching Earthquakes in classroom using open data,

case study: active fault bases.

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Definition

Open data is "digital data that is made available with the technical and legal characteristics necessary for it to be freely used, reused, and redistributed by anyone, anytime, anywhere" (*Open Data Charter 2015, para. 1).*

Pedagogical connections

- Rather than suggest that open data offers an entirely new pedagogy, it is important to identify links with existing teaching and learning concepts to guide research and practice.
- Four such connections are:
- Inquiry-based learning,
- Open education,
- Personalisation,
- Authenticity.

Why open data in geosciences education?

- Butcher (2015) summarizes three transformative benefits of OER, which could be applicable to open data:
- Increased range and reduced cost of resources.

- Support for adaptation of materials, which allows educators and students to be active participants who learn by doing and creating.
- Building capacity by providing educators access to the means of production of the resources.

Why open data in geosciences education?

- The Mediterranean region is often affected by earthquakes, which cause adverse effects in the social and economic sector.
- The understanding of the risks associated to natural phenomena and the increased awareness and preparedness of citizens can effectively contribute to limiting their negative effects on society (Sendai Framework 2015-2030).
- Urbanization and population growth in areas prone to natural disasters intensify the resulting negative socio-economic impacts.
- Given that an increase in the occurrence of natural disasters is predicted in this area, it is imperative to prevent and manage-deal with the problem by developing and implementing appropriate actions. The development and implementation of appropriately designed educational activities contributes to this direction.

What is the framework that open data can be included in the Geosciences' education

State:

In order for an activity to be included in teaching, it must be supported by a specific pedagogical framework.

Teaching tool:

The **active fault bases** is a teaching tool and in particular, the "model“ teaching tool.

The benefits for students

Provides the opportunity to students

- ✓ to observe
- ✓ to describe
- ✓ to study the creation of naturals hazards
- ✓

To develop

- ✓ emotional abilities
- ✓ psychomotor skills

within the field of learning of the geo-environment.

The benefits for students

Introduces to students

the research and exploratory way of thinking

In order to be able to:

- ✓ understand
- ✓ clarify
- ✓ correlate

the principles of natural sciences that they are taught at the curriculum concerning the phenomenon.

The benefits for Teachers

Allows teacher-student collaboration

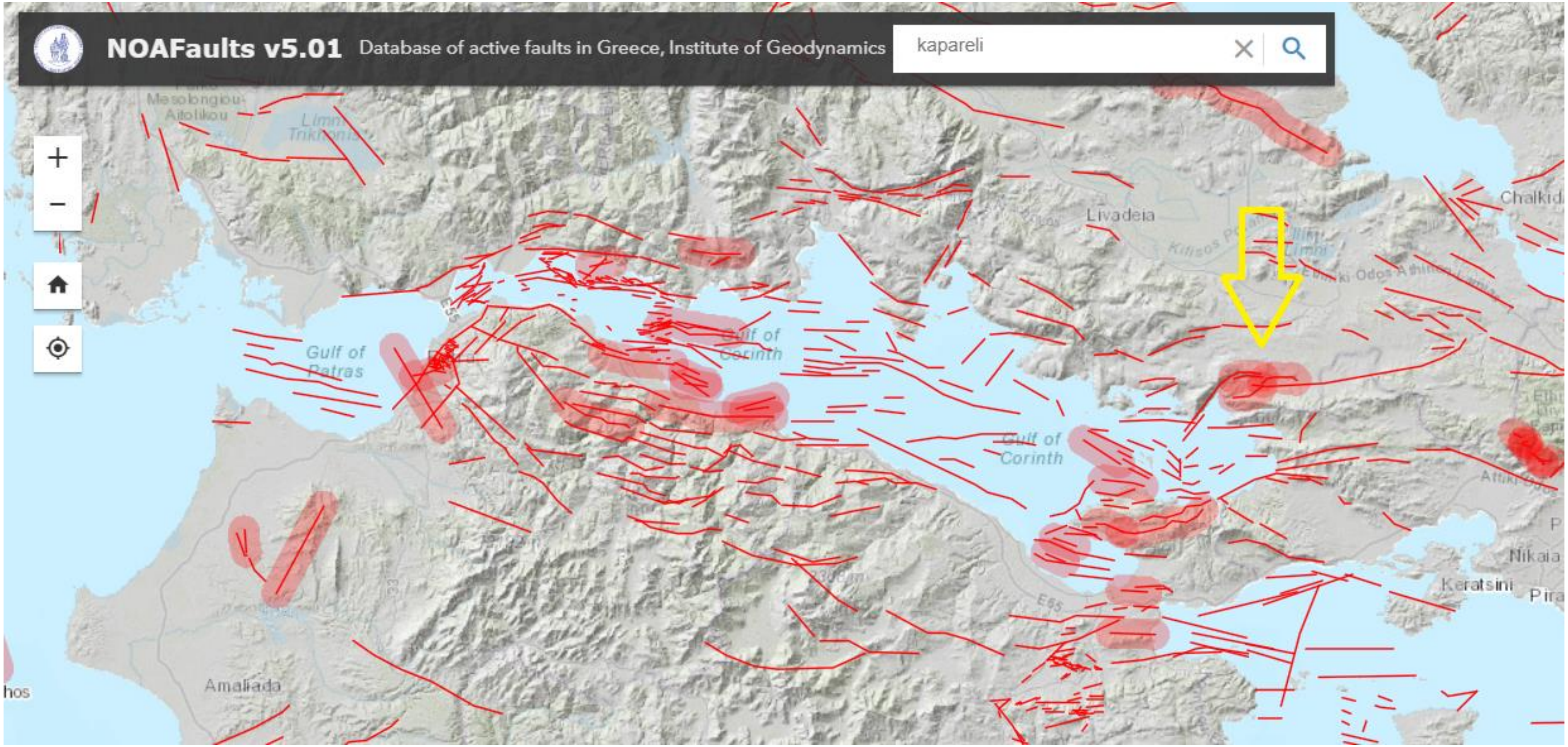
Active fault bases can help teaching many subjects, such as:

- ✓ Geology
- ✓ Physics (Oscillations, Energy, Electricity)
- ✓ Robotics - STEM

It can be a basis for expansion into other models, such as the phenomena of:

- ✓ Tsunamis
- ✓ Liquefaction
- ✓ All Naturals Hazards

1rst example:



https://noa-beyondapps.maps.arcgis.com/

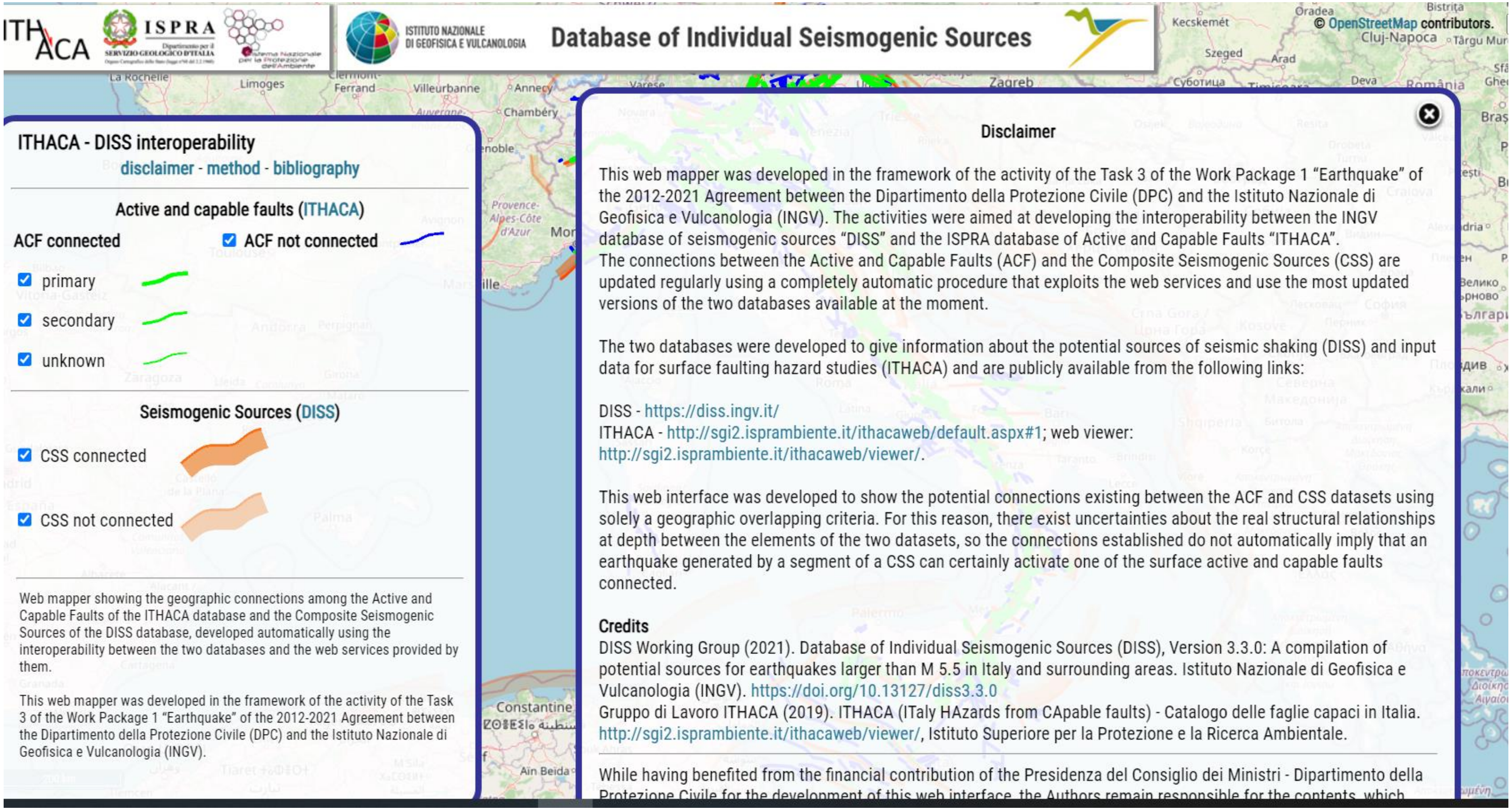
Student's sheets

Fault's data/Name	Egion	Erateini North	East Helike Fault	Kaparelli 3 fault
Geological Setting				
Seismic Event				
Historical Seismicity				
Maximum Magnitude				
Kinematics				
Risk Level				

Ask your students….

- ✓How do we recognize a fault in the field?
- ✓rank the faults from oldest to newest….
- ✓rank the faults from higher magnitude to smaller….
- ✓find for a link (if it is possible..) between faults magnitude and geological Setting

Promote your students to be “researchers”….



https://diss.ingv.it/ithdiss/

ITHACA Project

2nd example:

EarthViewer

3rd example:

Geology Unit: Plate Boundaries

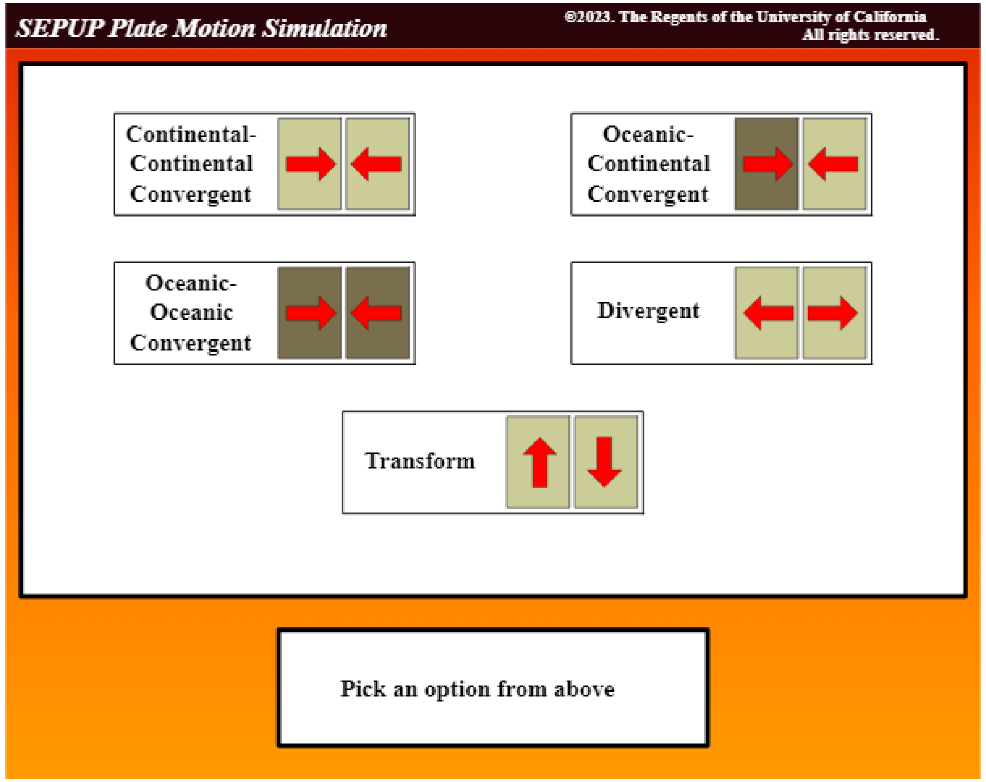
Plate Motion Simulation

Through this computer simulation, students investigate how Earth's surface changes over time due to geological processes caused by plate motion. Students analyze and interpret data from the simulation to identify the similarities and differences between the geological processes that happen at the three plate boundaries.

Resources

Student Book Pages and Student Sheets

Simulation



SEPUP
Issue-Oriented Science

Earthquakes | Volcanoes

Untitled Document

Tables Graph Map Slider Calc Text Plug

Significant_Earthquakes

Cases (939 cases)

index	DateTime	Latitude	Longitude	Depth (meters)	Magnitude
1	9/9/2...	-31.84	-179.33	111.05	6.9
2	9/9/2...	-10.01	161.53	64.54	6.5
3	9/6/2...	-18.48	179.34	670.65	7.9
4	9/5/2...	42.67	141.93	33.36	6.6
5	8/28/...	-22.07	170.05	26.68	7.1
6	8/24/...	-11.04	-70.82	609.48	7.1
7	8/21/2...	-16.02	168.15	13.44	6.5
8	8/21/2...	10.86	-62.88	154.27	7.3
9	8/19/...	-8.33	116.63	25.21	6.9
10	8/18/...	-16.98	-178.03	415.6	6.8
11	8/18/...	-18.11	-178.15	600	8.2
12	8/17/2...	-7.43	119.83	529	6.5
13	8/15/2...	51.42	-178.05	20	6.6
14	8/5/2...	-8.26	116.44	31	6.9
15	5/4/2...	19.32	-155	5.81	6.9
16	4/2/2...	-20.66	-63.01	559	6.8
17	3/29/...	-5.53	151.5	35	6.9
18	3/26/...	-5.5	151.4	40	6.7
19	3/8/2...	-4.38	153.2	22.86	6.8
20	3/6/2...	-6.3	142.61	20.49	6.7
21	2/25/...	-6.07	142.75	25.21	7.5
22	2/16/2...	16.39	-97.98	22	7.2
23	1/28/2...	-53.06	9.68	10	6.6

Map

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// SIMULATION

Geology Unit: Mapping Locations of Earthquakes and Volcanoes

Mapping Locations of Earthquakes and Volcanoes Activity

Investigation – Mapping Location Data

In this activity, students use the science and engineering practice of analyzing and interpreting data as they map the locations of significant earthquakes and major volcanoes around the world. They look for patterns in the distribution of earthquakes and volcanoes as a first step in discovering that Earth's surface is broken into plates.

Resources

Student Book Pages and Student Sheets

Activity

LAUNCH MAPPING ACTIVITY

Thank you for attention…

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